

Claims

1. A process for the production of a coating composition which comprises the steps of:
 - 5 (a) oxidising a mixture which comprises at least one plant protein and starch, in water at an alkaline pH; and
 - (b) heating the mixture concomitantly with oxidation or subsequent to oxidation to provide a composition with a viscosity from 1 to 100 centapoise, and a pH from 10 pH 7.5 to pH 9.
2. A process of claim 1 wherein the mixture has a solids content from 3% to 50%.
3. A process of claim 1 or 2 wherein the heating is performed at from 70°C to 150°C.
- 15 4. A process for the production of a coating composition which comprises the steps of forming a mixture of a plant protein and plant starch in water at a solids content from 3% to 50%, oxidising the mixture with an oxidising agent at alkaline pH and heating the oxidised mixture at a temperature from 70°C to 150°C until the 20 viscosity is lowered to 1 to 100 centapoise.
5. A process of claims 1 to 4 wherein the alkaline pH of step (a) is from 8 to 13.
6. A process of claim 5 wherein the alkaline pH of step (a) is from 9 to 12.
- 25 7. The process of claims 1 to 6 wherein said protein is a plant protein selected from the group consisting of wheat, rye, triticale, maize, oats, and barley protein.
8. The process of claim 1 to 6 wherein said protein is a mixture of two or more 30 different plant proteins selected from the group consisting of wheat, rye, triticale, maize, oats, and barley proteins.

9. The process of claims 1 to 8 wherein said starch is a plant starch selected from the group consisting of wheat, rye, sorghum, triticale, maize, oats, barley, tapioca, potato, sago and rice starch.
- 5 10. The process of claims 1 to 9 wherein said starch is selected from waxy starch and high amylose starch.
11. The process of claims 1 to 10 wherein said starch and protein mixture comprises from 4% w/w to 50% w/w plant protein.
- 10 12. The process of claims 1 to 11 wherein said starch/protein mixture is selected from the group consisting of flour, meal, grits and milled or crushed cereal grains.
13. The process of claim 12 wherein the mixture is a flour is selected from the group consisting of wheat flour, rye flour, triticale flour, maize flour, oat flour and barley flour.
- 15 14. The process of claim 13 wherein said flour has a protein content between 2% and 20%.
- 20 15. The process of claims 1 to 14 wherein an additional plant protein is added to the flour to increase protein level.
16. The process of claim 15 wherein said additional plant protein is from the same grain from which the flour was produced, or is a plant protein from another plant species.
- 25 17. The process of claim 1 to 16 wherein the starch and protein mixture comprises a solids content from 3% w/w to 50% w/w.
- 30 18. The process of claims 1 to 17 wherein said oxidation is conducted at a temperature from 25°C to 50°C for 5 to 30 minutes prior to subsequent heating for 5 to 150

minutes at a temperature of 50°C to 150°C until viscosity of the composition is from 1 to 100 centapoise.

19. The process of claims 1 to 18 wherein said composition is dried in a dryer to a flowable particulate state.
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20. The process of claims 1 to 19 wherein the oxidation and heating are conducted at the same time.
- 10 21. A composition for coating paper obtainable by a process as defined in any one of claims 1 to 20.
22. A process for coating paper comprising the step of applying a composition as defined in claim 21 to paper.
- 15 23. A process for coating paper which comprises the steps:
 - (a) preparing a composition for coating by a process as defined in any one of claims 1 to 20; and
 - 20 (b) applying the composition to paper.
24. A product obtainable by the process defined in claim 23.
25. A paper coated with an aqueous coating composition which comprises an alkali oxidised gelatinised starch/protein mixture, said composition having a viscosity from 1 to 100 centapoise, and a pH between pH 7.5 and pH 9.
- 30 26. An aqueous composition for coating paper or paper board which comprises an alkali oxidised gelatinised starch and protein mixture, said composition having a viscosity from 1 to 100 centapoise (cps), and a pH from pH 7.5 to pH 9.
27. A composition of claim 26 wherein the viscosity is from 5 to 80 centapoise.

28. A composition of claim 27, wherein the viscosity is from 5 to 60 centapoise.
29. A composition of claims 26 to 28 wherein the pH is from pH 7.8 to pH 8.8.
- 5 30. The composition of claim 26 to 29 wherein said protein is a plant protein selected from the group consisting of wheat, rye, triticale, maize, oats, and barley protein.
- 10 31. The composition of claim 26 to 29 wherein the protein is a mixture of two or more different plant proteins selected from the group consisting of wheat, rye, triticale, maize, oats, and barley protein.
32. The composition of claims 26 to 31 wherein said starch comprises a plant starch.
- 15 33. The composition of claims 26 to 32 wherein said starch is a plant starch selected from the group consisting of wheat, rye, sorghum, triticale, maize, oats, barley, tapioca, potato, sago and rice starch.
- 20 34. The composition of claims 26 to 33 wherein said starch is selected from waxy starch and high amylose starch.
35. The composition of claims 26 to 34 wherein said gelatinised starch and protein mixture comprises from 6% w/w to 50% w/w plant protein.
- 25 36. A composition of claim 35 wherein said gelatinised starch and protein mixture comprises from 8% w/w to 25% w/w.
- 30 37. The composition of claims 26 to 36 wherein said starch and protein mixture is selected from the group consisting of flour, meal, grits and milled or crushed cereal grains.

38. The composition of claim 37 wherein said cereal grains are selected from the group consisting of wheat, rye, triticale, maize, oat and barley grains.
39. The composition of claim 37 wherein said flour has a protein content between 2% and 20% w/w.
40. The composition of claims 37 to 39 wherein an additional plant protein is added to the flour to increase protein level.
- 10 41. The composition of claim 40 wherein said additional plant protein is from the same grain from which the flour was produced, or is a plant protein from another plant species.
- 15 42. The composition of claims 26 to 41 wherein said alkali oxidised aqueous gelatinised starch/protein mixture comprises a solids content of from 3% w/w to 50% w/w.
- 20 43. The composition of claims 26 to 42 wherein said alkali oxidised aqueous gelatinised starch/protein mixture is obtained by oxidising a plant starch and plant protein mixture with an oxidising agent under alkaline conditions and heating the oxidised mixture at a temperature from 70°C to 150°C until the viscosity is from 1 to 100 centapoise.
- 25 44. The composition of claim 43 wherein oxidation is conducted at a temperature of 25°C to 50°C for 5 to 30 minutes prior to heating for 5 to 150 minutes at a temperature of 50°C to 150°C until viscosity of the composition is from 1 to 100 centapoise.
- 30 45. The composition of claims 43 or 44 wherein oxidation is carried out under conditions of heating for a period of 5 to 150 minutes at a temperature of 50°C to 150°C until viscosity of the composition is from 1 to 100 centapoise.

46. The composition of claim 43 wherein oxidation and heating are conducted at the same time.
47. The composition of claims 26 to 46 which is dried in a dryer to a flowable particulate state.
48. An aqueous coating composition which comprises a mixture of starch and plant protein in water having a solids content of 3% w/w to 30% w/w, a protein content of 4% w/w to 50% w/w, a viscosity of 1 to 100 centapoise, and a pH from pH 7.5 to pH 9, wherein the starch is gelatinised and both the starch and protein in the mixture are alkali oxidised at a pH from pH 8 to pH 13.
49. A process for coating paper which comprises the step of applying a composition as defined in any one of claims 26 to 48 to paper, paperboard or cardboard.
50. A product obtainable by the process of claim 49.
51. A fibreboard comprising an alkali oxidised and gelatinised starch/protein mixture incorporated within a fibreboard.
52. The fibreboard according to claim 51, wherein said fibreboard is selected from the group consisting of plasterboard, composite board, and particleboard.
53. A process for the production of fibreboard, which comprises forming a mixture of plant protein and plant starch in water, preferably having from 3-50% solids content, oxidising the mixture with an oxidising agent at alkali pH at 25°C to 50°C for 5-30 minutes or up to 24-48 hours, mixing the alkali oxidised mixture with the fibreboard constituents, followed by heating the resultant mixture which may be formed into sheets in an oven at a temperature of 50°C to 150°C for 20 to 150 minutes.

54. The process of claim 48 wherein said fibreboard constituents are selected from the group consisting of gypsum, wood particles, and fibrous constituents.